

HOST RANGE AND NEW HOST RECORDS FOR THE PLUME MOTH
PLATYPTILIA CARDUIDACTYLA (LEPIDOPTERA: PTEROPHORIDAE)
FROM CALIFORNIA THISTLES (ASTERACEAE)

CHARLES E. TURNER, ROBERT W. PEMBERTON, AND SARA S. ROSENTHAL

Biological Control of Weeds, U.S. Department of Agriculture, Agricultural Research Service, Western Regional Research Center, Albany, California 94710.

Abstract.—Seventeen new host records are reported for the artichoke plume moth *Platyptilia carduidactyla* (Lepidoptera, Pterophoridae) from native and naturalized thistles (Asteraceae, Cardueae) in California. All are adult rearing records from field populations of the host thistles. The number of moths reared and the amount of host material collected for rearing are reported. The new records include the naturalized species *Arctium minus* and *Carduus pycnocephalus*, and 15 native *Cirsium* species: *Cirsium andersonii*, *C. andrewsii*, *C. brevistylum*, *C. californicum*, *C. campylon*, *C. ciliolatum*, *C. crassicaule*, *C. cymosum*, *C. douglasii*, *C. fontinale obispoense*, *C. hydrophilum vaseyi*, *C. loncholepis*, *C. pastoris*, *C. rhotophilum*, and *C. tioganum*. Seven of the newly reported *Cirsium* hosts are considered rare. Previous host records are also summarized. With one exception, all known hosts are in the thistle subtribe Carduinae.

The so-called artichoke plume moth, *Platyptilia carduidactyla* (Riley) (Lepidoptera, Pterophoridae) is the most serious pest of introduced cultivated globe artichoke (*Cynara scolymus* L., Asteraceae) in California (Haynes et al., 1981; Lange, 1941; Lange et al., 1954). This moth, which is native and widespread in North America, is multivoltine and feeds on leaf, stem, and flowerhead tissue of its host plants (Lange, 1950). The thistle tribe (Asteraceae, Cardueae) is an important group of native species, naturalized weeds, and the cultivated crops safflower (*Carthamus tinctorius* L.) and globe artichoke (Moore and Frankton, 1974; Ownbey et al., 1975; Reed, 1970; Robbins et al., 1970; USDA, SCS, 1982). Our study of the host pattern of the plume moth is part of a broader entomofaunal study of the thistle tribe in California (Pemberton et al., 1985; Turner et al., in press) as it relates to biological control of weedy naturalized thistles.

The previously reported host records for *P. carduidactyla* are as follows: *Centaurea melitensis* L. (Lange, 1941, 1950); *Cirsium arvense* (L.) Scop. (Lange, 1950); *C. callilepis* (Greene) Jeps. (reported as *C. americanum* Daniels var. *callilepis* Jeps.) (Lange, 1950); *C. discolor* (Muhl. ex Willd.) Spreng. (Marcovitch, 1916); *C. edule* Nutt. (possibly confused with *C. brevistylum* Cronq.) (Lange, 1941, 1950); *C. occidentale* (Nutt.) Jeps. (Lange, 1941, 1950); *C. proteanum* J. T. Howell (reported as *C. occidentale* var. *venustum* Jeps.) (Lange, 1941, 1950); *C. quercetorum* (Gray) Jeps. (Lange, 1941, 1950); *C. undulatum* (Nutt.) Spreng. (Lange, 1941, 1950); *C. vulgare* (Savi) Tenore (reported as *C. lanceolatum* (L.) Scop.) (Riley, 1869; Lange, 1941, 1950); *Cynara cardunculus* L. (Lange, 1941, 1950); *C. scolymus* L. (Essig, 1922; Lange, 1941, 1950); *Silybum marianum* (L.) Gaertn. (Essig, 1922). Where we use a different host name from

that originally reported, this was done in accordance with more recent treatments of the genus *Cirsium* (Jepson, 1925; Munz, 1973). There has been confusion between *C. brevistylum* and *C. edule*, which are closely related and similar (Moore and Frankton, 1962). It is doubtful that true *C. edule* occurs in California (Moore and Frankton, 1962; Munz, 1973). Of these previously reported hosts, explicit mention of emerged adults from host material is only made for *C. discolor*, *C. vulgare*, and *C. scolymus*. Of the previously reported hosts, *C. callilepis*, *C. discolor*, *C. edule*, *C. occidentale*, *C. proteanum*, *C. quercetorum*, and *C. undulatum* are native to North America (USDA, SCS, 1982).

All the new host records reported here are from material collected and reared by the authors except for the records prior to 1982, which are from material collected and reared by K. E. Frick and R. B. Hawkes, formerly affiliated with our Laboratory. Host material collected in 1982 consisted of periodic samples of ten whole plants from the same field populations of native and naturalized *Carduus* and *Cirsium* species. In 1983, 1984, and 1985 we sampled the flowerheads only of field populations of native and introduced species of *Arctium*, *Carduus*, *Carthamus*, *Centaurea*, *Cirsium*, *Cynara*, *Onopordum*, *Saussurea*, and *Silybum*. We collected lateral and terminal flowerheads at a stage between flowering and seed dissemination. All of the introduced species sampled were from naturalized populations except for samples from planted fields of artichoke and safflower. The host material was brought back to the lab for the rearing of adult plume moths and other thistle insects (Pemberton et al., 1985; Turner et al., in press).

D. C. Ferguson and W. H. Lange, Jr. determined the plume moths. The authors, G. D. Barbe, T. C. Fuller, and G. B. Ownbey determined the thistles. Voucher specimens of most plume moths and host thistles are retained in our lab.

We report here 17 new host records for

P. carduidactyla from native and naturalized thistle species, including information on host location and sample date, number of flowerheads sampled, and the number of emerged adults. The new host records are from the relatively common native thistles *Cirsium andersonii* (Gray) Petrak, *C. andrewsii* (Gray) Jeps., *C. brevistylum* Cronq., *C. californicum* Gray, *C. cymosum* (Greene) J. T. Howell, *C. douglasii* DC., *C. pastoris* J. T. Howell, and *C. tioganum* Congd.; and from the relatively rare (Federal Register, 1985) native thistles *C. campylon* H. Sharsm., *C. ciliolatum* (L. Henders.) J. T. Howell, *C. crassicaule* (Greene) Jeps., *C. fontinale* (Greene) Jeps. var. *obispoense* J. T. Howell, *C. hydrophilum* (Greene) Jeps. var. *vaseyi* (Gray) J. T. Howell, *C. loncholepis* Petrak, and *C. rorthophilum* Blake. New host records also are from the naturalized thistles *Arctium minus* Bernh. and *Carduus pycnocephalus* L.

These newly reported host species occur in a wide variety of habitats located throughout cismontane California (Munz, 1973). The number of emerged adult plume moths was generally smaller than the number of larvae and pupae associated with the host plants. This difference in number between adult versus immature plume moths could have been due to insect parasitoids (Lange, 1950) or to our rearing conditions. We also reared adult plume moths from *C. occidentale*, *C. proteanum*, *C. quercetorum*, *C. undulatum*, and *C. vulgare* among the hosts previously reported.

Native *Cirsium* species are the only known native North American hosts for *P. carduidactyla*. In North America *Cirsium* contains ca. 130 native species (Moore and Frankton, 1974; Ownbey et al., 1975), with ca. 30 species native to California (Munz, 1973). The moth is now known from 21 *Cirsium* species (excluding *C. edule*) native to North America, and 19 species native to California. Ironically, the plume moth was first described from specimens reared from naturalized *Cirsium vulgare* in Missouri

(Riley, 1869). Riley (1869) used the perhaps more appropriate colloquial name, thistle plume moth, for *P. carduidactyla*.

Globe artichoke has been grown commercially in California at least since 1900 (Stokdyk, 1932). *P. carduidactyla* has been a pest of globe artichoke in California at least since 1922 (Essig, 1922; Lange, 1941). Both *Cirsium* and *Cynara* are in the subtribe Carduinae (Dittrich, 1977), which indicates that they are relatively closely related. The plume moth is a native stenophagous insect that is capable of host utilization of an introduced crop plant that is relatively closely related to its native hosts.

All known host taxa are in the thistle tribe Cardueae; and all known hosts are in the subtribe Carduinae with the exception of *Centaurea melitensis*, which is in the subtribe Centaureinae (Dittrich, 1977). Lange (1950) reported a larval feeding record of *P. carduidactyla* from a *C. melitensis* population adjacent to a planting of globe artichoke that had the moth. We did not rear *P. carduidactyla* from five samples of *C. melitensis*, or from any of the 14 samples from 3 other species of *Centaurea* that we studied (unpublished data).

NEW HOST RECORDS

Arctium minus. Dimmick State Park, Mendocino Co., Calif.: host plants coll. 6-IX-62 by K. E. Frick, 9 adults emerged by 27-IX-62.

Carduus pycnocephalus. 2.5 km N. of Napa, Napa Co., Calif.: host plants coll. 15-V-63 by R. B. Hawkes, 1 adult emerged on 17-VI-63.

Cirsium andersonii. Gumboot Rd., 19.0 km from Castle Lake Rd., Siskiyou Co., Calif.: 108 host heads coll. 22-VIII-84, 1 adult emerged by 25-IX-84.

Cirsium andrewsii. Abbott's Lagoon, Pt. Reyes, Marin Co., Calif.: host plants coll. 11-V-82, 2 adults emerged by 5-VI-82; host plants coll. 1-VI-82, 1 adult emerged from head by 22-VI-82; host plants coll.

13-VII-82, 5 adults emerged from heads by 17-XI-82; host plants coll. 3-VIII-82, 3 adults emerged from heads by 11-VI-83; 100 host heads coll. 22-VI-85, 1 adult emerged by 5-XI-85.

Cirsium brevistylum. ca. 14 km W. of Willits, Mendocino Co., Calif.: host plants coll. 25-VII-61 by K. E. Frick, 2 adults emerged by 4-VIII-61; host plants coll. 2-VII-62 by K. E. Frick, 20 adults emerged by 23-VII-62. Crescent City, Del Norte Co., Calif.: host plants coll. 16-VIII-61 by K. E. Frick, 5 adults emerged by 5-IX-61. Mt. Tamalpais, Marin Co., Calif.: host plants coll. 5-VII-62 by K. E. Frick, 3 adults emerged. (Additional later host records from Del Norte and Mendocino counties coll. by K. E. Frick available from the authors.) Abbott's Lagoon, Pt. Reyes, Marin Co., Calif.: 100 host heads coll. 17-V-84, 3 adults emerged by 1-VIII-84; 100 host heads coll. 5-VII-84, 3 adults emerged by 14-VIII-84. MacKerricher Beach, Mendocino Co., Calif.: 89 host heads coll. 10-VII-84, 17 adults emerged by 14-VIII-84.

Cirsium californicum. Hwy. 49 between Downieville and Sierra City, Sierra Co., Calif.: 100 host heads coll. 21-VI-84, 1 adult emerged by 31-VII-84.

Cirsium campylon. Blackbird Valley off Mines Rd., Santa Clara Co., Calif.: host plants coll. 8-VI-82, 1 adult emerged from head by 30-VI-82; host plants coll. 1-VII-82, 1 adult emerged from head by 21-VII-82; host plants coll. 31-VIII-82, 2 adults emerged from head by 17-XI-82. Mines Rd., 11.6 km S. of Alameda—Santa Clara county line, Santa Clara Co., Calif.: 100 host heads coll. 30-VI-85, 1 adult emerged by 5-XI-85.

Cirsium ciliolatum. York Rd. at Mulloy Rd., Siskiyou Co., Calif.: 100 host heads coll. 27-VI-84, 1 adult emerged by 30-VII-84.

Cirsium crassicaule. Kern Nat. Wildlife Refuge, Kern Co., Calif.: 60 host heads coll. 23-VI-85, 1 adult emerged by 5-VII-85.

Cirsium cymosum. Callahan—Cecilville Rd., 8.0 km from Callahan, Siskiyou Co., Calif.: 67 host heads coll. 5-VIII-83, 1 adult emerged by 22-XII-83.

Cirsium douglasii. Callahan—Cecilville Rd., 8 km from Callahan, Siskiyou Co., Calif.: host plants coll. 27-VII-82, 1 adult emerged from heads by 18-VIII-82; host plants coll. 17-VIII-82, 1 adult emerged from heads by 17-XI-82. Hwy. 3, 3.9 km S. of Scott Mt. Pass, Trinity Co., Calif.: 100 host heads coll. 4-VIII-84, 2 adults emerged by 3-IX-84.

Cirsium fontinale obispoense. San Simeon Cr. Rd., 8.4 km from Hwy. 1, San Luis Obispo Co., Calif.: 100 host heads coll. 26-V-84, 1 adult emerged by 31-VII-84.

Cirsium hydrophilum vaseyi. West Point Inn trail, Mt. Tamalpais, Marin Co., Calif.: 100 host heads coll. 22-VI-85, 1 adult emerged by 5-XI-85.

Cirsium loncholepis. Guadalupe Dunes, San Luis Obispo Co., Calif.: 60 host heads coll. 14-VI-83, 1 adult emerged by 22-XII-83.

Cirsium pastoris. Callahan—Cecilville Rd., 2–8 km from Callahan, Siskiyou Co., Calif.: host plants coll. 7-VII-82, 1 adult emerged from stem by 21-VII-82; 100 host heads coll. 9-VIII-84, 1 adult emerged by 4-X-84. Slough Rd., S. of Louie Rd. exit from I-5, Siskiyou Co., Calif.: 100 host heads coll. 29-VI-83, 3 adults emerged by 1-X-83. Edgewood exit from I-5, 5.6 km N. of Weed, Siskiyou Co., Calif.: 100 heads coll. 9-VIII-84, 3 adults emerged by 4-X-84.

Cirsium rorthophilum. Guadalupe Dunes nr. Oso Flaco Lake, San Luis Obispo Co., Calif.: 42 host heads coll. 15-VI-83, 2 adults emerged by 5-VII-84.

Cirsium tioganum. Willow Cr. Rd., Siskiyou Co., Calif.: 82 host heads coll. 12-VII-84, 1 adult emerged by 30-VII-84. Dorris Brownell Rd., nr. jct. with Willow Cr. Rd., Siskiyou Co., Calif.: 100 host heads coll. 18-VII-85, 9 adults emerged by 6-XI-85.

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